BRITISH MARINE WORMS.

Ray Society: A Monograph of the British Annelids. By Prof. W. C. McIntosh, F.R.S. Vol. ii., part ii. Polychæta. Syllidæ to Ariciidæ. Pp. 233–524+23 plates. (London: Dulau and Co., Ltd., 1910.) Price 25*s.* net.

THIS volume constitutes a further instalment of Prof. McIntosh's large monograph of British Polychæts, and its publication raises the hope that the entire work will be completed in a few years. The families described are amongst the most interesting and the most familiar to naturalists, yet they have probably never received such detailed treatment as is here accorded, with the result that we now have such a survey as Huxley first planned when he undertook professional work. The variety and beauty of this section of the British fauna will be a surprise to most naturalists.

The most interesting points in the volume are the assumption of the "epitokous" stage among the Nereids, and the phenomenon known as "Palolo."

During their asexual or "atokous" stage, Nereids are provided with similar lobes and bristles on every segment, but when the breeding season ensues many species of this family undergo a metamorphosis. The head and eyes enlarge, the posterior two-thirds of the body grows out segmentally into new lamellar feet, and these in turn develop long swimming bristles. In this "hetero-nereis" or "epitokous" phase, the two sexes often differ in colour and in habits, and in at least one species there are again two castes of males. The behaviour no less than the appearance of these animals now finds a new expression. Up to this period, Nereis has lived a sluggish life in a burrow. Now as hetero-nereis, he or she strikes out for the open sea, swimming easily and gracefully by rhythmical contractions of the paddles, and discharging broadsides of ova or of milt into the water. This effort is probably the final act of a career, for, carried away by the act of discharge, these pelagic Nereids may rupture and die.

On this subject the veteran naturalist of St. Andrews has gathered together his own vast stores of information and also those of his fellow-workers. He traces the development of this metamorphosis in all available instances, and collates a great amount of information, not only as to British, but concerning all Polychæts that exhibit this phenomenon.

With regard to palolo, this Fijian word has reference to a peculiar swarming of Polychæts at the surface of the sea. At Amboina, round Japan, on the coast of Florida and Samoa, swarms of Eunicid worms suddenly appear at definite times and disappear as suddenly as they came. The interest of their advent is increased by its coincidence with a certain phase of the moon in two months of the year, October and November in some places, March and April in others. Several genera exhibit this habit of swarming on two or three definitely fixed nights if the weather be clear. By the following morning not a trace of them is to be seen.

Still more remarkable are the details of the process. During the preceding twelve months these Annelids have led a sedentary life, hiding as far as is known in crannies or burrows in rock and coral. No sooner, however, is the moon at full in March or in October, as the case may be, than these Eunicids turn round in their burrows, twist off their tails, and send them wriggling on to the surface, the head end meanwhile remaining in the burrow. The whole mature population simultaneously perform the act, with the result that the neighbouring water acquires an appearance not unlike that of vermicelli. These severed tail ends are provided with special ocelli, and swim away laden with ova or with milt, which they discharge with every contraction. In a few minutes disruption is complete, and hence by sunrise the act is over. Meanwhile the head-ends, ensconced in their burrows, are already making scar-tissue, and in time regenerate the missing portion.

Such in brief, though, of course, subject to local modifications, is the meaning of this expression, and we now ask is there a British palolo, or have we anything of this nature on our coasts? The monograph before us gives no certain answer. True, there is a British *Lysidice punctata* at Guernsey, closely allied to a species that acts palolo elsewhere, but at present such swarming, if it occurs, has escaped observation. As to this and many other features of habits, coloration, and development, there is still a wide field for research amongst Polychæts. We trust that the publication of this monograph will stimulate to fresh observations on this interesting group.

Rather unwillingly, a word of criticism must be added, and it is to repeat a request made in the review of the preceding section that appeared in this journal in 1908. It was there urged that the family name of each species should be placed as a headline to one of the two facing pages, preferably the left, and we would also ask for an outline classification in each part as issued. For working purposes the absence of these two simple devices creates an extraordinary amount of trouble, and the reviewer is, after careful search, still far from clear as to the classification of, for example, the Eunicidæ.

In conclusion, the magnificent plates of coloured figures reflect the greatest credit on everyone concerned in their production. Plate liii., for instance, representing *Nereis virens* in all its three feet of beauty is a wonderful picture. Prof. McIntosh is to be heartily congratulated on the completion of such a large section of this great work.

F. W. GAMBLE.

CHEMISTRY FOR MINERS.

Elementary Chemistry for Coal-mining Students. By Prof. L. T. O'Shea. Pp. ix+319. (London: Longmans, Green, and Co., 1911.) Price 6*s.* net.

THE object of this little book is to furnish coal-miners with a knowledge of as much of the science of chemistry and of its applications as they are likely to find useful in their everyday work. Its contents are thus naturally divisible into two sections, the first giving an outline of chemical principles, and the second a rather more detailed account of such portions of the subject of coal-mining as depend more especially upon the above principles.

Such a book undoubtedly raises the question whether it is advisable in the interests of the students to lay before them only fragments of a complete science, even though it be admitted that the particular fragments that are most likely to be useful to them in their after-career have been selected with care and discrimination. On one hand, it may be urged that it is better for the coal-miner to have a rudimentary knowledge of chemistry than to have none at all, and that unless the amount of science required of him is cut down to the lowest possible limits, he will have none of it, whilst on the other we have the obvious dangers that attend a limited knowledge of any subject, and in the present case more especially the risk that the man who has mastered such a book as Prof. O'Shea's will think that he has got a real grasp of the science of chemistry and will remain in ignorance of the vast field that this book does not profess even to touch upon. No chemist needs to be told that a book that treats only of the chemistry of certain of the metalloids must necessarily present only a very imperfect outline of the principles of modern chemical science, and there would probably be a pretty general consensus of opinion that, if possible, it would be far better for the mining student to learn the elements of chemistry as an abstract pure science from a book on chemistry, and, having mastered these, then to be taught what portions of that science he has to apply to the problem of his daily work.

Prof. O'Shea has evidently come to the conclusion that the latter method is the less practical, and no doubt there is very much to be said for his view; it must be admitted that the coal-miner who thoroughly masters his little book will benefit greatly thereby, and will certainly obtain a fairly clear understanding of many of the phenomena that he meets with in the pit. The first chapters give an outline of the leading principles of chemical combination, and of the physical and chemical properties of oxygen, nitrogen, air, hydrogen, water, sulphur, carbon, and the oxides of carbon, including a useful chapter on flame and the safety lamp; then follow a number of chapters on the application of the facts thus set forth, on coal, coking, and the recovery of by-products, on explosives, and on gas and dust explosions; the book concludes with some brief chapters on certain chemical and physical calculations, which will prove useful for the proper understanding of certain parts of the subject. Prof. O'Shea has done his work well, and has evidently selected his material with great care and judgment, and with a sound appreciation of the needs and limitations of the coal-miner. He has also taken care to express himself throughout in plain, simple language, and it may be suspected that it is to the desire for simplicity that a certain amount of slipshod writing in the book is due, as, for example, in such expressions as "one of the most improved forms," "a purely dust explosion," &c.; a somewhat flagrant case is the definition of the atomic weight of an element as "a number which represents how much heavier its atom is than the atom of hydrogen," where the author obviously means "how many times as heavy."

It is difficult to see why Prof. O'Shea should insist that nitro-glycerol is the more correct name for nitro-glycerine; the latter is a thoroughly well-known and generally accepted trivial name, and if he wants chemical exactitude, he should have used the strictly correct form, glyceryl tri-nitrate; it is now generally recognised that nitro-glycerine and gun-cotton are not, as Prof. O'Shea states, nitro-compounds, but nitrates. In the same way exception may well be taken to the statement that coal occurs in "veins." Such inaccuracies, though they are undoubtedly blemishes in an otherwise very well-written book, do not, of course, detract seriously from its value as a whole, and will presumably be corrected in a future edition. Prof. O'Shea may fairly be congratulated on having produced a little book that gives, within a convenient compass, a great deal of information that will prove extremely useful to all coal-miners, and be found to render very great assistance to the class for which it is more particularly intended. H. L.

ANOTHER BOOK ON EVOLUTION.

Phases of Evolution and Heredity. By Dr. David Berry Hart. Pp. xi+259. (London: Rebman, Ltd., 1910.) Price 5s. net.

THIS book is not written by a man red-handed fresh from an encounter with nature. If his hands needed washing before he wrote, it was to remove the dust of books. Would that the water could have removed the taint of much reading also. The notion that the truth must be sought in books is still widely prevalent, and the present dearth of illiterate men constitutes a serious menace to the advancement of knowledge.

The author of this book constitutes an exception to the law that the more certain a man is that he is right the more probable is it that he is wrong. Dr. Hart lays stress on the fallibility of the human intelligence. He realises that he may be mistaken. And he is. The title-page of his book bear these words:

"Every seeker after Truth is dependent on the knowledge of his Age. He must, therefore, shape his coat according to his cloth, and expect a misfit. The words of Cromwell to the General Assembly of the Scottish Church should ever ring in his ears: 'I beseech you, in the bowels of Christ, think it possible you may be mistaken.'"

The book deals with "Mendelism," "Biometry," "Mnemism," "Observation Bee-Hives," "Evolution in Religion," and "Men who have Revealed Themselves."

The obstacles which, according to Dr. Hart stand in the way of our acceptance of the Mendelian hypothesis seem to us wholly illusory. He does not see why segregation should not occur in F_1, and asks the following questions, which seem to us quite easy to answer. "1. Why, if this explanation be true, do we get all the plants of the F_1 tall-dwarf crossing, tall, and not talls and dwarfs in the 1:2:1 ratio?" [*Answer:* Because the only one kind of union between gametes can take place, namely tall×dwarf.] "2. The recessive quality reappears in F_2. Is it not, then, equal to the dominant?" [*Answer:* Yes, if you like.]